INDIAN HEART JOURNAL 66 (2014) 503–505

Available online at www.sciencedirect.com

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Original Article

Effect of a Government Scheme on Reperfusion Trends in a tertiary care centre in South India

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ARTICLE INFO

Article history:
Received 11 May 2014
Accepted 11 August 2014
Available online 28 August 2014

Keywords:
Government health insurance
STEMI
Reperfusion

ABSTRACT

Aims: Coronary artery disease is the leading cause of mortality and morbidity in our country, of which ST elevation myocardial infarction (STEMI) accounts for the major part of health spending. We sought to study the effect of induction of government health insurance scheme on the trends of reperfusion in patients of acute STEMI.

Methods and results: 1133 patients presenting with acute STEMI enrolled. 1079 (95.1%) received some form of reperfusion therapy. Primary PCI was used in 60.6% of patients as the primary reperfusion modality, a six fold increase as compared to previous years. Government health insurance accounted for the one third of all. 34.5% patients underwent pharmacological reperfusion, most commonly with streptokinase. 4.9% patients of STEMI did not receive any form of reperfusion therapy in contrast to 14% during previous years.

Conclusion: Introduction of government health insurance along with increased awareness has resulted in dramatic changes in the management of STEMI patients.

1. Introduction

Coronary artery disease is the leading cause of mortality globally.[1] 60% of the world's heart disease is expected to occur in India.[2] Early restoration of patency of the infarct related artery is standard of care in management of acute ST elevation myocardial infarction (STEMI).[3] Patients presenting with STEMI are usually from the local population and many from poor socio economic status. Affordability of interventional procedures is always a problem. In rural population, awareness among people about coronary artery disease and the recent advances in treatment is lacking. Government schemes have been introduced which cover medical treatment, including emergencies, for below poverty line citizens. These schemes along with subsidies provided by the treating hospital have resulted in an increasing number of primary angioplasties (PCI), which is a life saving procedure.

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http://dx.doi.org/10.1016/j.ihj.2014.08.001

2. Materials and methods

This was a retrospective observational study done at Cardiology Department of Christian Medical College (CMC), Vellore, a tertiary care centre. The Department of Cardiology, CMC Vellore is equipped with all the required facilities for tackling cardiac emergencies and primary PCI. The cardiac catheterization laboratory and interventional cardiologists are available round the clock. The department receives around 700–800 patients of acute ST elevation myocardial infarction per year. All patients irrespective of age who presented with acute STEMI were included in the study. Acute ST elevation myocardial infarction (STEMI) was defined as per the recent universal definition of MI.[4]

2.1. Data collection and analysis

In this study, we aim to study the current trends in revascularization in STEMI in a tertiary care centre in South India. The number of patients thrombolysed with streptokinase, tenecteplase or undergoing primary PCI were determined since February 1st 2012,when Tamil Nadu Chief Minister's Comprehensive Health Scheme (TNCMCHS) was started in our institute. The percentages, mean and standard deviations were calculated. The data was scrutinized for the trends in revascularization. Data was collected from the in-patient and out-patient records as well as the records in the Coronary Care Unit (CCU) and Chest Pain Unit (CPU). Other variables that were taken into account included age, gender and risk factors for coronary artery disease. The number of patients who benefited with TNCMCHS was also taken into account. This was compared with the published data from our institute before the scheme was introduced.

3. Results

Between 1st February 2012 and 31st October 2013, a total of 1133 patients with ST-segment elevation myocardial infarction (STEMI) were enrolled into this study. The collected data is given in tabular column Table 1.

- Inferior wall MI includes Inferior and all other combinations (Right ventricular, Posterior and Lateral)
- Anterior wall MI includes Anterior, Antero-sepal, Anterolateral and Extensive anterior wall STEMI
- Smoker includes only current smoker

4. Discussion

Mean age of STEMI patients in present study is 54.2 ± 10.4 years, similar (56.3 ± 11.8 years) to the previous data 2008–2011, Brajesh et al 2012 from the same centre. In our country, cardiovascular diseases occur a decade earlier as compared to west. Early age of STEMI could lead to tremendous loss of productive years and can have an adverse outcome on the economy as well as national growth. Affordability is the main hindrance in our country for availing the best medical care for STEMI patients.

4.1. Trends in STEMI

This study also analyzed the main risk factors for CAD prevalence in the Indian population which included diabetes mellitus (41.8%), systemic hypertension (37.7%), current smokers (32.9%) and dyslipidemia (51%). As in the previous data from Brajesh et al diabetes mellitus is a significant contributor to cardiovascular diseases.[5–7]

The present study highlights the current scenario of STEMI and its management in a tier 3 South Indian city. With 24 h available cardiac catheterization laboratories and experienced cardiologists, the rates of primary PCI has been steadily increasing. Primary PCI was used in 60.6% of patients as the primary reperfusion modality, a six fold increase as compared to previous years (Figs. 1 and 2).

There are many reasons for this, such as early diagnosis and referral from rural hospitals and general practitioners, good transport facilities due to 108 Ambulance services started under government health initiative, easy availability of government health insurance (TNCMCHS) and growing awareness. In the general population, there is an increased acceptance of mechanical reperfusion as a treatment modality, possibly as a result of the increased awareness due to better results seen in patients undergoing the procedure under the scheme. TNCMCHS covered patients made up to one third of the total number of patients undergoing mechanical reperfusion (Figs. 2 and 3). Still, a large proportion of patients (70.8%) are able to pay for primary revascularization therapy and get benefited as our hospital has subsidized the costs.

34.5% patients still underwent pharmacological reperfusion due to various reasons including unwillingness to undergo invasive procedures in spite of clearly explaining the risk benefits. Streptokinase was primarily used for pharmacological reperfusion, in almost all the patients. Tenecteplase (TNK) was rarely used as the thrombolytic agent, mainly due

Table 1 – Comparison of baseline characteristics and management strategy of patients enrolled in earlier study by Brajesh et al[5] from the same centre vs present study.

Characteristics	Earlier study $n = 1905$ (%)	Present study $n = 1133$ (%)
Age	56.3 ± 11.8	54.2 ± 10.4
Males	1577 (83)	938 (82.8)
Females	328 (17)	195 (17.2)
Smoking	589 (31)	373 (32.9)
Diabetes Mellitus	944 (49.7)	474 (41.8)
Hypertension	657 (34)	428 (37.7)
Dyslipidemia	1345 (70)	530 (46.8)
Location of MI		
Anterior wall MI	1150 (60)	581 (51.2)
Inferior wall MI	727 (38)	552 (48.8)
Reperfusion therapy		
Pharmacological	1431 (75.1)	392 (34.5)
PCI	205 (10.7)	687 (60.6)

Data are numbers (%) or mean + SD.

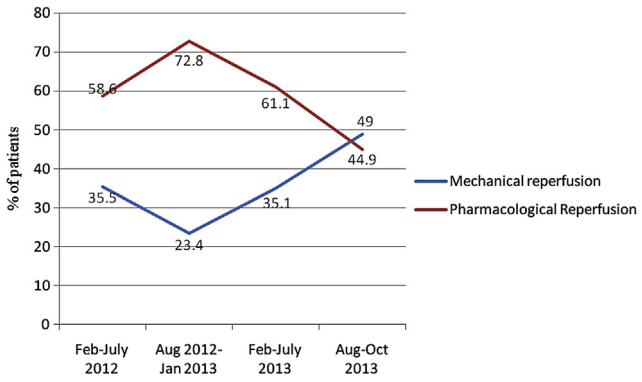

Fig. 1 – Trends of reperfusion in STEMI.

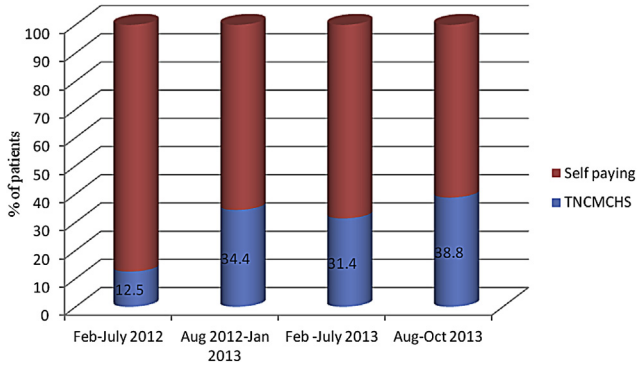

Fig. 2 – Contribution of TNCMCHS for mechanical reperfusion over study period.

to the cost factor and those patients may have opted for primary angioplasty, as primary PCI is offered at only double the cost of the drug.

An encouraging result was seen in the analysis of patients who did not receive any reperfusion therapy because of various reasons. 4.9% patients of STEMI did not receive reperfusion therapy and this is in contrast to earlier data where 14% did not receive any form of reperfusion.

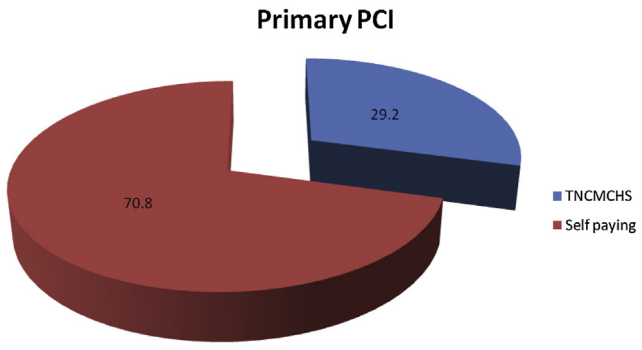

Fig. 3 – Source of finances for primary PCI over study period (% of patients).

Mechanical reperfusion, the ideal choice when done according to standard care, is slowly replacing pharmacological reperfusion as primary modality for STEMI management. But it has a long way to go especially in a rural setting in a developing country like India. Greater awareness in general population, government health initiatives which are easily accessible to the general population, early referral from the general practitioner, quicker transport and a well equipped referral hospital, all have an important roles to play.

In foreseeable future, mechanical reperfusion in form of primary PCI or as adjunct to thrombolysis will be more widely used as the first-line approach in contemporary management of STEMI in areas catered by our institute.

5. Conclusion

Universal health insurance, quicker transportation, early referral and lower procedural cost will help to provide the mechanical reperfusion therapy available to all STEMI patients in foreseeable future.

Conflicts of interest

All authors have none to declare.

Acknowledgment

Researchers would like to acknowledge Christian Medical College (CMC) Vellore in for providing the equipment and facilities for this research.

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